MARUSON®
TECHNOLOGY CORP.
Power Solutions All Your Needs

ULTIMA SERIES 1K-3KVA
On-Line UPS

USER MANUAL

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6. Specifications

MODEL		ULT-1K(L)	ULT-2K(L)	ULT-3K(L)
CAPACITY*		1000 VA / 800 W	2000 VA / 1600 W	3000 VA / 2400 W
INPUT				
Voltage Range	Low Line Transfer	160VAC/140VAC/120VAC/110VAC ± 5% or 80VAC/70VAC/60VAC/50 VAC ± 5% (based on load percentage 100% - 80 % / 80 % - 70 % / 70 - 60 % / 60 % - 0)		
	Low Line Comeback	168VAC/148VAC/128VAC/118VAC ± 5 % or 84VAC/74VAC/64VAC/54 VAC ± 5 % (based on load percentage 100% - 80 % / 80 % - 70 % / 70 - 60 % / 60 % - 0)		
	High Line Transfer	300 VAC ± 5 % or 150 VAC ± 5 %		
	High Line Comeback	290 VAC ± 5 % or 145 VAC ± 5 %		
Frequency Range		40 ~ 70 Hz (Auto sensing)		
Phase		Single phase with ground		
Power Factor		≧ 0.98		
OUTPUT				
Output voltage		208/220/230/240VAC or 110/115/120/127VAC		
AC Voltage Regulation		± 1%		
Frequency Range (Synchronized Range)		47 ~ 53 Hz or 57 ~ 63 Hz		
Frequency Range (Batt. Mode)		50 Hz ± 0.25 Hz or 60Hz ± 0.3 Hz		
Current Crest Ratio		3:1		
Harmonic Distortion		≦ 3 % THD (Linear Load) ≦ 6 % THD (Non-linear Load)	≦ 4 % THD (Linear Load) ≦ 7 % THD (Non-linear Load)	
Transfer Time	AC Mode to Batt. Mode	Zero		
	Inverter to Bypass	4 ms (Typical)		
Waveform (Batt. Mode)		Pure Sinewave		
EFFICIENCY				
AC Mode		88.5 % (89% peak)	89.3 % (90% peak)	87%
Battery Mode		83.7 % (86% peak)	88.2 % (89% peak)	85%
BATTERY				
Standard Model	Battery Type	12V / 9Ah		
	Battery Numbers	2	4	6
	Charging Current (max.)	1.0 A		
	Charging Voltage	27.4 VDC ± 1%	54.7 VDC ± 1%	82.1 VDC ± 1%
Long Runtime Model	Battery Type & Numbers	Depending on the capacity of external batteries		
	Charging Current	1A / 2A / 5 A (Default)	1A / 2A / 4A / 8A (Default)	
	Charging Voltage	27.4 VDC ± 1%	54.7 VDC ± 1%	82.1 VDC ± 1%
PHYSICAL				
Standard Model	Dimensions (DxWxH)(mm)	400 X 146 X 205	397 x 145 x 220	421 x 190 x 318
	Net Weight (kgs)	9.3	17.8	28.8
Long Runtime Model	Dimensions (DxWxH)(mm)	400 X 146 X 205	397 x 145 x 220	421 x 190 x 318
	Net Weight (kgs)	4.8	7.4	13.5
ENVIRONMENT				
Operation Humidity		20-90 % RH @ 0- 40°C (non-condensing)		
Noise Level		Less than 45dBA @ 1 Meter		
MANAGEMENT				
Smart RS-232 Port/Card		Supports Windows® 2000/2003/XP/Vista/2008, Windows® 7, Linux, Unix, and MAC		
Intelligent Slot		Power management from SNMP manager and web browser		

* Derate capacity to 80% when the output voltage is adjusted to 208VAC.

1. Important Safety Warning

Please comply with all warnings and operating instructions in this manual strictly. Save this manual properly and carefully read the following instructions before installing the unit. Do not operate this unit before reading through all safety information and operating instructions carefully.

1-1. Transportation

- Please transport the UPS system only in the original packaging to protect against shock and impact.

1-2. Preparation

- Condensation may occur if the UPS system is moved directly from cold to warm environment. The UPS system must be absolutely dry before being installed. Please allow at least two hours for the UPS system to acclimate to the environment.
- Do not install the UPS system near water or in moist environments.
- Do not install the UPS system where it would be exposed to direct sunlight or near a heater.
- Do not block ventilation holes in the UPS housing.

1-3. Installation

⚠To guarantee UPS normal operation, before connecting devices to the UPS, please verify that ground and neutral lines of the connected devices are not short circuited. (see Figure 1)

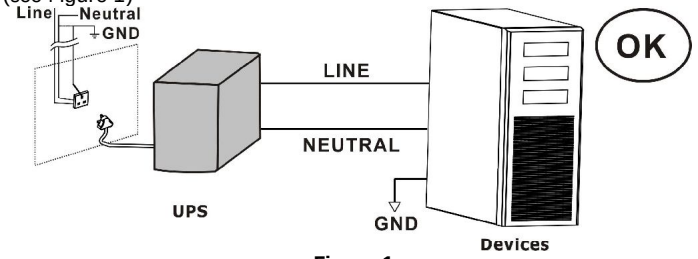


Figure 1

⚠If neutral line and ground line are short circuited, please add isolation transformer between UPS and devices. (see Figure 2)

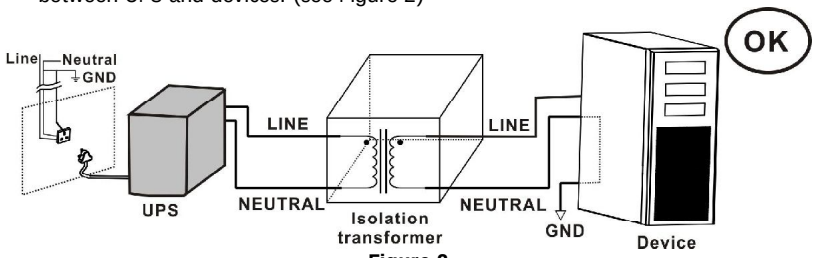


Figure 2

⚠ **Never** connect neutral line of input to neutral line of output. Otherwise, it will cause the damage of the UPS. (see Figure 3)

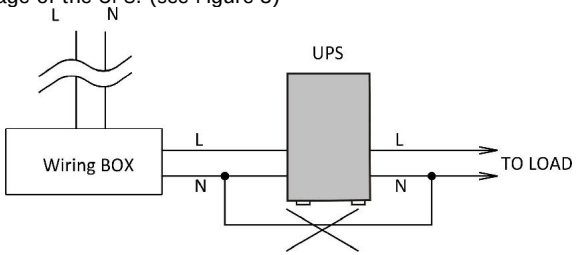


Figure 3

- Do not connect appliances or devices which would overload the UPS system to the UPS output sockets.
- Place cables in such a way that no one can step on or trip over them.
- The UPS can be operated by any individuals with no previous experience.
- Connect the UPS system only to an earthed shockproof outlet which must be easily accessible and close to the UPS system.
- Please use only VDE-tested, CE-marked mains cable (e.g. the mains cable of your computer) to connect the UPS system to the building wiring outlet (shockproof outlet).
- Please use only VDE-tested, CE-marked power cables to connect the loads to the UPS system.
- When installing the equipment, make sure the sum of the leakage current of the UPS and the connected devices does not exceed 3.5mA.

1-4. Operation

- Do not disconnect the mains cable on the UPS system or the building wiring outlet (shockproof socket outlet) during operations since this would cancel the protective earthing of the UPS system and of all connected loads.
- The UPS system features its own internal current source (batteries). The UPS output sockets and output terminals block may be electrically live even if the UPS system is not connected to the building wiring outlet.
- In order to fully disconnect the UPS system, first press the OFF/Enter button to disconnect the mains.
- Prevent fluids and other foreign objects from entering the inside of the UPS system.

1-5. Maintenance, Service, and Faults

- The UPS system operates with hazardous voltages. Repairs may be carried out only by qualified maintenance personnel.
- **Caution -** risk of electric shock. Even after the unit is disconnected from the mains (building wiring outlet), components inside the UPS system are still connected to the battery and electrically live and dangerous.
- Before carrying out any kind of service and/or maintenance, disconnect the batteries and verify that no current is present and no hazardous voltage exists in the terminals of high capability capacitor such as BUS-capacitors.
- Only persons adequately familiar with batteries and with the required precautionary measures may replace batteries and supervise operations. Unauthorized persons must be kept well away from the batteries.

5. Storage and Maintenance

Operation

The UPS system contains no user-serviceable parts. If the battery service life (3~5 years at 25°C ambient temperature) has been exceeded, the batteries must be replaced. In this case, please contact your dealer.

Be sure to deliver the used battery to a recycling facility or ship it to your dealer in the replacement battery packing material.

Storage

Before storing, charge the UPS for minimum 5 hours. Store the UPS covered and upright in a cool, dry location. During storage, recharge the battery in accordance with the following table:

Storage Temperature	Recharge Frequency	Charging Duration
-25°C - 40°C	Every 3 months	1-2 hours
40°C - 45°C	Every 2 months	1-2 hours

Symptom	Possible Cause	Remedy
Fault code is shown as 1, 2, 3, 4, 11, 12, 13 and 41 on LCD display and alarm is continuously sounding.	A UPS internal fault has occurred. There are two possible causes: 1. The load is still supplied, but directly from AC power via bypass. 2. The load is no longer supplied by power.	Contact your dealer.
Battery backup time is shorter than nominal value	Batteries are not fully charged	Charge the batteries for at least 5 hours and then check capacity. If the problem still persists, consult your dealer.
	Batteries defect	Contact your dealer to replace the battery.

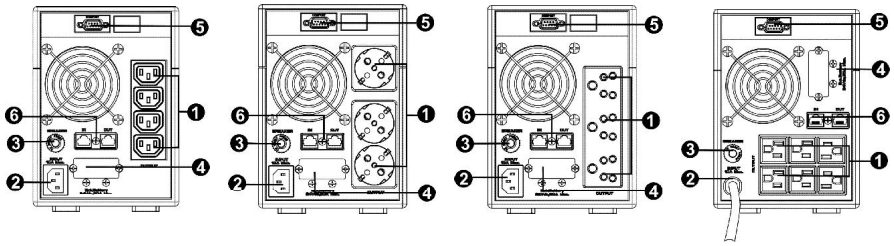
- **Caution -** risk of electric shock. The battery circuit is not isolated from the input voltage. Hazardous voltages may occur between the battery terminals and the ground. Before touching, please verify that no voltage is present!
- Batteries may cause electric shock and have a high short-circuit current. Please take the precautionary measures specified below and any other measures necessary when working with batteries:
  - —Remove wristwatches, rings, and other metal objects
  - —Use only tools with insulated grips and handles.
- When changing batteries, install the same number and same type of batteries.
- Do not attempt to dispose of batteries by burning them. This could cause battery explosion.
- Do not open or destroy batteries. Escaping electrolyte can cause serious injury to the skin and eyes and may be toxic.
- Please replace the fuse only with the same type and amperage in order to avoid fire hazards.
- Do not dismantle the UPS system.

2. Installation and Setup

NOTE: Before installation, please inspect the unit. Be sure nothing inside the package is damaged. Please keep the original package in a safe place for future use.

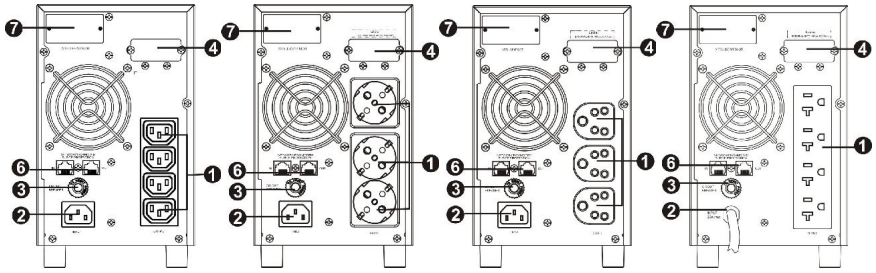
2-1. Rear Panel View

ULT-1K(L)



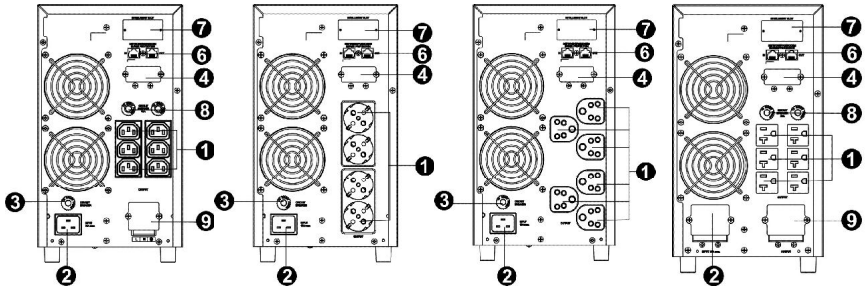
IEC Type | Schuko Type | India Type | NEMA Type

ULT-2K(L)



IEC Type | Schuko Type | India Type | NEMA Type

ULT-3K(L)



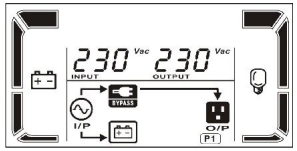
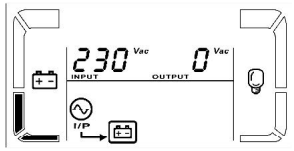
IEC Type | Schuko Type | India Type | NEMA Type

1. Output receptacles
2. AC input
3. Input circuit breaker

4. Troubleshooting

If the UPS system does not operate correctly, please solve the problem by using the table below.

Symptom	Possible Cause	Remedy
No indication and alarm even though the mains is normal.	The AC input power is not connected well.	Check if input power cord firmly connected to the mains.
	The AC input is connected to the UPS output.	Plug AC input power cord to AC input correctly.
The icon ⚠ and ~ flashing on LCD display and alarm is sounding every second.	Line and neutral conductors of UPS input are reversed.	Rotate mains power socket by 180° and then connect to UPS system.
The icon ⚠ and 🔋 flashing on LCD display and alarm is sounding every second.	The external or internal battery is incorrectly connected.	Check if all batteries are connected well.
Fault code is shown as 27 and the icon BATT. FAULT is lighting on LCD display and alarm is continuously sounding.	Battery voltage is too high or the charger is fault.	Contact your dealer.
Fault code is shown as 28 and the icon BATT. FAULT is lighting on LCD display and alarm is continuously sounding.	Battery voltage is too low or the charger is fault.	Contact your dealer.
The icon ⚠ and OVER LOAD is flashing on LCD display and alarm is sounding twice every second.	UPS is overloaded.	Remove excess loads from UPS output.
	UPS is overloaded. Devices connected to the UPS are fed directly by the electrical network via the Bypass.	Remove excess loads from UPS output.
	After repetitive overloads, the UPS is locked in the Bypass mode. Connected devices are fed directly by the mains.	Remove excess loads from UPS output first. Then shut down the UPS and restart it.
Fault code is shown as 43 and The icon OVER LOAD is lighting on LCD display and alarm is continuously sounding.	The UPS shut down automatically because of overload at the UPS output.	Remove excess loads from UPS output and restart it.
Fault code is shown as 14 and the icon SHORT is lighting on LCD display and alarm is continuously sounding.	The UPS shut down automatically because short circuit occurs on the UPS output.	Check output wiring and if connected devices are in short circuit status.

Operating Mode	Description	LCD Display
Bypass mode	When input voltage is within acceptable range but UPS is overload, UPS will enter bypass mode or bypass mode can be set by front panel. Alarm will sound every 10 seconds.	
Standby mode	UPS is powered off and no output supply power, but can still charge batteries.	

3-7. Faults Reference Code

Fault Event	Fault Code	Icon	Fault Event	Fault Code	Icon
Bus start fail	01	x	Inverter voltage Low	13	x
Bus over	02	x	Inverter output short	14	SHORT
Bus under	03	x	Battery voltage too high	27	BATT. FAULT
Bus unbalance	04	x	Battery voltage too low	28	BATT. FAULT
Inverter soft start fail	11	x	Over temperature	41	x
Inverter voltage high	12	x	Over load	43	OVER LOAD

3-8. Warning Indicators

Warning	Icon (flashing)	Alarm
Low battery	⚠ LOW BATT.	Sounding every second
Overload	⚠ OVER LOAD	Sounding twice every second
Battery is not connected	⚠	Sounding every second
Overcharge	⚠	Sounding every second
Site wiring fault	⚠ I/P	Sounding every second
Over temperature	tP ⚠	Sounding every second
Charger failure	CH ⚠	Sounding every second
Out of bypass voltage range	⚠ BYPASS	Sounding every second

4. External battery connection (only available for "L" models)
5. RS-232 communication port
6. Modem/Phone line/Network surge protection
7. Intelligent slot
8. Output circuit breaker
9. Output terminal

2-2. Setup the UPS

Step 1: UPS Input Connection

Plug the UPS into a two-pole, three-wire, grounded receptacle only. Avoid using extension cords. The input plug is a #18*3C for 1K/2K and 1.5mm^2 *3C or 14*3C for 3K.

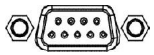
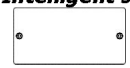
Step 2: UPS Output Connection

Simply plug devices to output sockets. During power failure, UPS will provide power to connected devices.

Step 3: Communication Connection

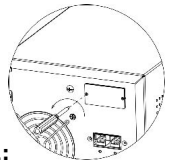
Communication port:

RS-232 port ***Intelligent slot***

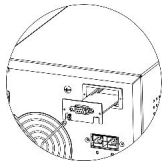



To allow for unattended UPS shutdown/start-up and status monitoring, connect one end of the communication cable to the RS-232 port and the other to the communication port of your PC. With the monitoring software installed, you can schedule UPS shutdown/start-up and monitor UPS status through the PC.

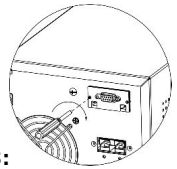
The 2K(L) model is equipped with intelligent slot for SNMP, RS-232, USB, or AS-400 card. When installing with the communication card in the UPS, it will provide advanced communication and monitoring options.



Step 1:
Remove cover of intelligent slot.



Step 2:
Insert communication card into the slot



Step 3:
Screw card tightly and complete installation.

Step 4: Network Connection

Network/Fax/Phone surge port

IN OUT

Connect a single modem/phone/fax line into surge-protected IN outlet on the back panel of the UPS unit. Connect from OUT outlet to the equipment with another modem/fax/phone line cable.

Step 5: Turn On the UPS

Press the ON/Mute button on the front panel for two seconds to power on the UPS.

Note: The battery charges fully during the first five hours of normal operation. Do not expect full battery run capability during this initial charge period.

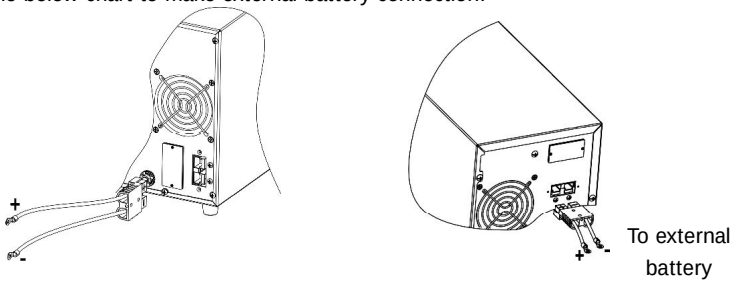
Step 6: Install Software

For optimal computer system protection, install UPS monitoring software to fully configure UPS shutdown. You may insert provided CD into CD-ROM to install the monitoring software. If not, please follow steps below to download and install monitoring software from the internet:

1. Go to the website **http://www.power-software-download.com**
2. Click the ViewPower software icon and then choose your required OS to download the software.
3. Follow the on-screen instructions to install the software.
4. When your computer restarts, the monitoring software will appear as an orange plug icon located in the system tray near the clock.

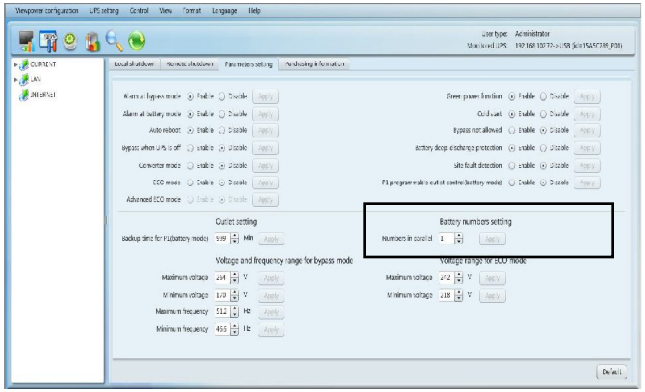
Step 7: External Battery Connection

Follow the below chart to make external battery connection.

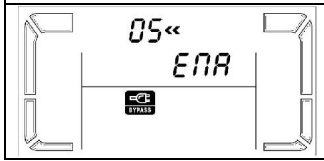


Step 8: External Battery Capacity Configuration in Software

To calculate accurate backup time of external batteries, it's necessary to configure battery numbers in software. The standard calculated capacity for one battery is 9Ah. If connecting to 100Ah batteries, then it's equal to 11 in parallel (100Ah / 9Ah ≈ 11 sets).



l **05: Bypass Mode Enable/Disable**

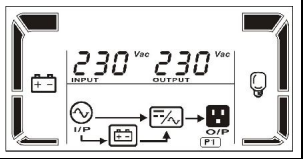
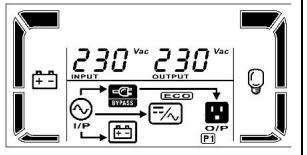
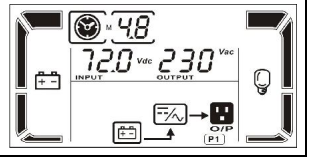
Interface	Setting
	**ENA:** Bypass mode enabled **DIS:** Bypass mode disabled

l **06: Bypass Voltage Range Setting**

Interface	Setting
	Press the Down key or Up key to set the acceptable high voltage point and acceptable low voltage point: **HLS:** Bypass high voltage point **LLS:** Bypass low voltage point For 208/220/230/240 VAC models: 230-264: setting the high voltage point from 230Vac to 264Vac 170-220: setting the low voltage point from 170Vac to 220Vac For 110/115/120/127 VAC models: 120-132: setting the high voltage point from 120Vac to 132Vac 85-115: setting the low voltage point from 85Vac to 115Vac

l **00: Exit Setting**

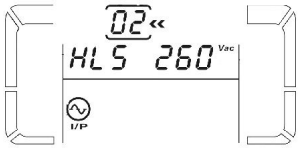
3-6. Operating Mode Description

Operating Mode	Description	LCD Display
Online mode	When the input voltage is within acceptable range, UPS will provide pure and stable AC power to output. The UPS will also charge the battery at online mode.	
ECO mode	Energy saving mode: When the input voltage is within voltage regulation range, UPS will bypass voltage to output for energy saving.	
Battery mode	When the input voltage is beyond the acceptable range or power failure and the alarm is sounding every 4 seconds; UPS will backup power from battery.	

l **01: Output Voltage Setting**

Interface	Setting
	For 208/220/230/240 VAC models, you may choose the following output voltage: 208: present output voltage is 208Vac 220: present output voltage is 220Vac 230: present output voltage is 230Vac 240: present output voltage is 240Vac For 110/150/120/127 VAC models, you may choose the following output voltage: 110: present output voltage is 110Vac 115: present output voltage is 115Vac 120: present output voltage is 120Vac 127: present output voltage is 127Vac

l **02: Input Acceptable Voltage Range Setting**

Interface	Setting
	Press the Down key or Up key to set the acceptable high point and acceptable low point of input voltage: **HLS**: High loss voltage in Line mode (For 208/220/230/240 VAC models, the setting range is from 260V to 300V. For 110/115/120/127 VAC models, the setting range is from 130V to 150V. **LLS**: Low loss voltage in Line mode (For 208/220/230/240 VAC models, the setting range is from 160V to 190V. For 110/115/120/127 VAC models, the setting voltage is from 80V to 95V)

l **03: ECO Enable/Disable**

Interface	Setting
	ENA: ECO mode enabled **DIS:** ECO mode disabled

l **04: ECO Voltage Range Setting**

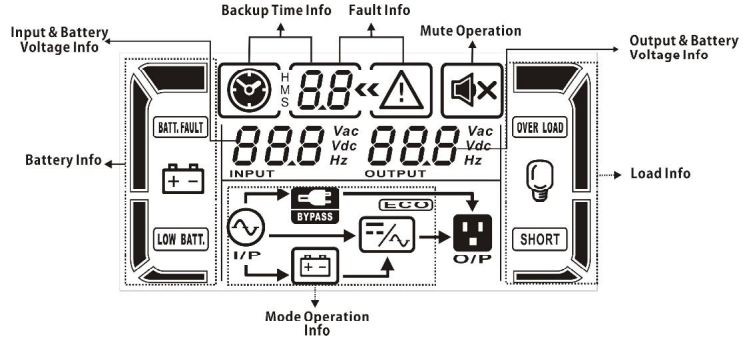
Interface	Setting
	Press the Down key or Up key to set the acceptable high point and acceptable low point of input voltage: **HLS:** High loss voltage in ECO mode (For 208/220/230/240 VAC models, the setting range is from +7V to -24V of the nominal voltage. For 110/115/120/127 VAC models, the setting range is from +3V to -12V of the nominal voltage). **LLS:** Low loss voltage in ECO mode (For 208/220/230/240 VAC models, the setting range is from -7V to -24V of the nominal voltage. For 110/115/120/127 VAC models, the setting voltage is from +3V to -12V of the nominal voltage)

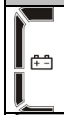
3. Operations

3-1. Buttons Operation

Button	Function
ON/Mute Button	– Turn on the UPS: Press and hold ON/Mute button for at least 2 seconds to turn on the UPS. – Mute the alarm: After the UPS is turned on in battery mode, press and hold this button for at least 5 seconds to disable or enable the alarm system. But it's not applied to the situations when warnings or errors occur. – Down key: Press this button to display previous selection in UPS setting mode. – Switch to UPS self-test mode: Press ON/Mute buttons simultaneously for 5 seconds to enter UPS self-testing while in AC mode.
OFF/Enter Button	– Turn off the UPS: Press and hold this button at least 2 seconds to turn off the UPS in battery mode. UPS will be in standby mode under normal power or transfer to Bypass mode if the Bypass enable setting by pressing this button. – Confirm selection key: Press this button to confirm selection in UPS setting mode.
Select Button	– Switch LCD message: Press this button to change the LCD message for input voltage, input frequency, battery voltage, output voltage and output frequency. It will return back to default display when pausing for 10 seconds. – Setting mode: Press and hold this button for 5 seconds to enter UPS setting mode when UPS is in standby mode or bypass mode. – Up key: Press this button to display next selection in UPS setting mode.
ON/Mute + Select Button	– Switch to bypass mode: When the main power is normal, press ON/Mute and Select buttons simultaneously for 5 seconds. Then UPS will enter to bypass mode. This action will be ineffective when the input voltage is out of acceptable range.

3-2. LCD Panel



Display	Function
Backup time information	
	Indicates the backup time in pie chart.
	Indicates the backup time in numbers. H: hours, M: minute, S: second
Fault information	
	Indicates that the warning and fault occurs.
	Indicates the warning and fault codes (the codes are listed in details in 3-5 section).
Mute operation	
	Indicates that the UPS alarm is disabled.
Output & battery voltage information	
	Indicates the output voltage, frequency, or battery voltage. Vac: output voltage, Vdc: battery voltage, Hz: frequency
Load information	
	Indicates the load level by 0-25%, 26-50%, 51-75%, and 76-100%.
	Indicates overload.
	Indicates the load or the UPS output is short circuit.
Mode operation information	
	Indicates the UPS connected to the mains.
	Indicates the battery is working.
	Indicates the bypass circuit is working.
	Indicates the ECO mode is enabled.
	Indicates the Inverter circuit is working.
	Indicates the output is working.
Battery information	
	Indicates the Battery level by 0-25%, 26-50%, 51-75%, and 76-100%.
	Indicates the battery is fault.
	Indicates low battery level and low battery voltage.
Input & battery voltage information	
	Indicates the input voltage or frequency. Indicates battery voltage in 1K model. Vac: Input voltage, Hz: input frequency, Vdc: battery voltage
	Indicates battery charge/discharge voltage and current (A) (only available for 2K model)

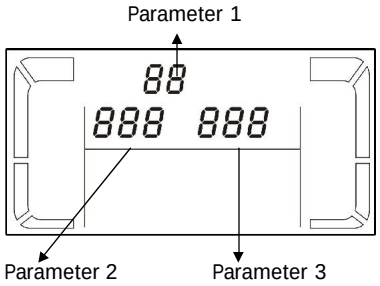
3-3. Audible Alarm

Battery Mode	Sounding every 4 seconds
Low Battery	Sounding every second
Overload	Sounding twice every second
Fault	Continuously sounding
Bypass Mode	Sounding every 10 seconds

3-4. LCD Display Wording Index

Abbreviation	Display Content	Meaning
ENA		Enabled
DIS		Disabled
ESC		Escape
HLS		High loss
LLS		Low loss
BAT		Battery
TP		Temperature
CH		Charger

3-5. UPS Setting



There are three parameters to set up the UPS.

Parameter 1: For program alternatives. There are 6 programs to set up. Refer to below table.
Parameter 2 and Parameter 3 are the setting options or values for each program.